Colorado Department of Health

Hazardous Materials & Waste Management Division

Comments

on

DRAFT

TECHNICAL MEMORANDUM (No. 2)

EXPOSURE SCENARIOS

HUMAN HEALTH RISK ASSESSMENT

for

WALNUT CREEK PRIORITY DRAINAGE

(OU-6)

ROCKY FLATS PLANT

JUNE, 1993

SPECIFIC COMMENTS:

Section 2.1, History of IHSS's Within OU6: The text in this section states that Figure 2-2 shows the location of the OU6 boundary. However, this boundary does not appear to be clearly demarcated in Figure 2-2. This discrepancy needs to be remedied.

Section 2.4, Geology and 2.5.1 Groundwater: The discussions of the geology and the groundwater in these sections do not reflect more recent information included in an Ebasco study described in Appendix C Addendum of the HAP's Briefing Book No. 12, May, 1993. Please, update the information in these two sections to reflect the current understanding of geology and hydrology.

Section 3.2.1, Current Off-site Land Use: The last paragraph in this section states, "Current land use in the area immediately east and southeast of OU6 includes all of the uses mentioned above, with the predominant uses are open space (sic), single-family detached dwellings, and horse-boarding operations. Cattle are grazed locally on a seasonal basis. Two small cattle herds (approximately 10 to 20 cattle in each herd) have been observed approximately 2 1/2 miles east and southeast of the Plant. Industrial facilities to the south include the TOSCO laboratory, Great Western Inorganics Plant, and Frontier Forest Products". However, the last paragraph in the next section, 3.2.2, states, "The above information indicates that current land use in the immediate vicinity of the RFP is primarily commercial/industrial and that such land use will

continue into the future. It is therefore likely that the potential for residential development in this area will be impeded by the growth of business and industry that is expected to occur."

These two statements are not consistent. Much of the land adjacent to Rocky Flats is currently zoned commercial/industrial. However, that is not the way most of the land is currently used, as pointed out in the first paragraph above, and on Jefferson County Land Use Inventory maps. The Division has consistently commented on this kind of misinterpretation and misrepresentation of the land use situation near Rocky Flats in the Exposure Scenario Tech. Memos from other OUs (specifically OUs 2, 7, and 3). These kinds of inconsistencies and misinterpretations must be corrected.

Figure 3-6, Jefferson Center Comprehensive Development Plan: What is meant by the "Planned Growth Area" on the buffer zone of the RFP in this map?

Figure 3-7: The exposure points for the current on-site worker, the future on-site worker, the on-site ecological researcher, and the on-site resident are shown over the whole OU6. **Averaging exposure over the whole OU will not meet RCRA requirements or IAG requirements to determine the risk at the source.**

Section 4.0, Exposure Pathways: Dermal exposure should be included in the human intake route bullet.

Section 4.3, Exposure Points, Future Use Scenarios: The same comment listed under Figure 3-7 applies here. Risk at each contaminant source must be determined.

The area described under "Ecological researcher" does not include all of OU6. The North Spray field would not be included, for example. This needs to be remedied.

Section 4.4, Exposure Media: The Division does not agree that groundwater is not an exposure medium. Although approximately one-half of the monitoring wells were dry following completion, the remaining wells, specifically because they were completed in a dryer time of year (November-January), may constitute reliable, single-family water sources on an daily basis. The Division will apply state ground water standards in lieu of risk assessment; nevertheless, DOE must determine the extent of ground water contamination, whether state standards are violated and, if necessary, determine remedial actions to remediate ground water resources and protect surface water resources. DOE must rework the subject paragraph to reflect the Division's determination that ground water is a potential pathway subject to state ground water standards.

Section 4.6.1, Incomplete or Negligible Exposure Pathways for All Receptors: On Page 4-6, what is the source for the statement,

"These animals are not consumed locally"?

Agriculture currently exists in nearby off-site areas. Even though it is anticipated that this use will gradually diminish and eventually disappear from parcels closest to the site, and even though the farmers, horse-boarders, etc. may not make their living solely from agriculture, and may not meet DOE's definition of subsistence agriculture, the risks to these residents need to be assessed. As such, at a minimum, off-site residential fruit and vegetable intake needs to be considered. If any farmers in the area eat a substantial portion of homegrown meat or dairy products, their risks must also be considered.

The Division has not been convinced that RFP will not be primarily either residential or agricultural in the future. Either of those two uses would be consistent with the type of current use around the Rocky Flats Plant, even though much of the current zoning is industrial.

Section 4.6.5, Future On-Site Construction Worker: DOE's definition of a construction worker's job as only encompassing construction of a subsurface basement is too narrow. Construction workers also build roads, bridges, etc., all of which conceivably could happen at Rocky Flats in the future. Under both of these latter situations, dermal contact with surface water is reasonable.

The Division has decided to accept the argument that inhalation of outdoor volatiles is a minor pathway, even for construction workers, and that it does not need to be assessed.

On page 4-12, the words, "and subsoil" should be inserted in the bullet after "Dermal contact with soil".

Section 4.6.6, Future On-Site Ecological Researcher: It is unclear why the on-site ecological researcher's inhalation of airborne particulates would be considered "insignificant" when it was significant for the future on-site resident.

Section 4.6.7, Future On-Site Residents: See the comment to Section 4.4 and amend the third paragraph of page 4-14 regarding "Groundwater ingestion is an incomplete pathway...".

Section 5.0, Estimating Chemical Intakes: On page 5-2, the Division continues to contend that sensitive populations like children (age 0 to 6 years) should be assessed. This recommendation is supported by both EPA (EPA Region 10 guidance on dermal exposure; EPA's Exposure Factors Handbook; EPA's Combustor Emission guidance 1990), the ICRP (1975) and DOE (OU1 and OU3 risk assessments) precedents, by Division policy on RCRA as well as all other CERCLA sites in Colorado, recent NAS recommendations (Pesticides in the Diets of Infants and Children, NAS, 1993), and good risk assessment practice. Specific guidance is available in the above EPA

publications. At the minimum, the Division believes the effects of specific chemicals on children should be assessed qualitatively. The IAG states that "both sensitive and potentially exposed populations shall be characterized" (IAG, Attachment 2, VII.D.1.b, p.32).

Section 5.1.1, General Exposure Assumptions: Unless specifically discussed below, the Division generally agrees with the exposure factors and assumptions DOE has chosen.

The Division conditionally accepts a longer (6 month) exposure time for a construction worker pending additional information from the regional OSHA office.

Division agrees to the use of Ward Whicker's estimates for the times that academic ecological researchers might work at Rocky Flats. It should be noted that the time limitations for this type of ecological researcher would not apply to an ecological worker in a caretaker position, such as might occur if the ecological preserve option occurs. This type of worker is likely to work longer hours, and therefore the exposure calculation would be underestimated for the individual.

Section 5.1.2, Inhalation Assumptions: While Division does not dispute the use of the 75% deposition factor for inhaled particles or the assumption that all deposited chemicals are absorbed, DOE must consider that RfCs or slope factors are often comparable to delivered doses, not absorbed doses or doses deposited in the lung. It is incumbent on DOE to correctly compare absorbed doses with those RfCs or slope factors that are based on absorbed dose, and administered doses with those RfCs or slope factors that are based on administered dose (RAGS p. A-3). Therefore, DOE cannot apply an absorption factor (regardless of its value) across the board, but can only do so on a chemical-specific basis, when it is appropriate.

It should be noted that particles derived both from soil and dried sediment can be inhaled. Are the dried sediment concentrations of various COCs as well as the soil concentrations being factored into the models used to determine air concentrations?

Section 5.1.3, Soil Ingestion Assumptions: The fraction contacted (FC) = 0.06 for the current on-site worker appears to have been calculated based on the ratio of the areas at OU6 to the rest of Rocky Flats rather than time. The Division believes that this kind of calculation is unacceptable.

The Division has not accepted the fraction contacted (FC) = 0.5 for any other OU. In the absence of site-specific information, this factor seems rather arbitrary. Moreover, the use of this fraction is not consistent with the determination of the risk at the source. Furthermore, fraction contacted is not included as acceptable in

the Template.

Any matrix effect will have to be documented and accepted by EPA and Division before use.

Section 5.1.4, Homegrown Produce Ingestion Assumptions: Please provide information and references that the assumption that a 90% reduction in chemical concentration on the food surface due to washing of produce applies to organic chemicals and metals as well as to transuranium elements.

Division believes that the risks from ingestion of homegrown fruits and vegetables grown off-site which have taken up contaminants from the roots need to be assessed. Reduced bioavailability because of binding to soils or dilution should not be equated with no bioavailability. Moreover, there are a number of contaminants in soil found on the RFP site, and DOE is not taking the risks from exposure to an accumulation of multiple chemicals into account. DOE also is not taking toxicity of possible contaminants or the initial surface concentration into account. Division does not believe that there is a basis for excluding organic chemicals from consideration, and does not agree with the argument that intake from ingestion and dermal contact will greatly exceed intake from fruits and vegetables. For organic chemicals, intake from plant ingestion often exceeds intake from soil ingestion or dermal contact, sometimes by nearly an order of magnitude. Therefore, plant uptake from soils as well as surface deposition should be included in the risk assessment.

Section 5.1.5, Surface Water/Suspended Sediment Ingestion Assumptions: The Division is not convinced that a future ecological researcher would likely be exposed to sediment and to surface water only 7 events/year, and 2.6 hours/event. This amount of exposure is the average number of times an individual might go swimming (EPA's Exposure Factors Handbook), and thus may be appropriate for a residential scenario. However, it does not really apply to an individual who is performing an ecological research project, which may involve extensive wading when taking samples.

Section 5.1.6, Dermal Contact with Soil: Most metals are not absorbed well across the skin. Mercury is an exception. How will mercury be assessed should it become a COC?

Division contends that the 2,910 cm^2/day for dermal contact with soil for both the residential and occupational receptors is incorrect. An assumption of long sleeved shirts and long pants are appropriate for occupational receptors. Thus, the 2,910 cm^2/day value may be appropriate for occupational receptors. However, this value is not reasonable or typical for adult residential receptors especially in warm seasons, and should be adjusted upwards.

Division believes that a soil adherence factor value of 0.5 mg/cm^2 is not in accordance with EPA dermal guidance. The central tendency value is 0.2 mg/cm^2, and an upper value is 1.0 mg/cm^2. The range of values reported by the EPA's Dermal Exposure Assessment guidance is 0.2-1.5 mg/cm^2 per event.

Tables 5-1 through 5-33: These tables should be amended to reflect the Division's comments above.